

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P36023-P0	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/JP2004/016938	International filing date (day/month/year) 15 November 2004	Priority date (day/month/year) 28 November 2003
International Patent Classification (IPC) or national classification and IPC Int. Cl. H03D7/00(2006.01), H03D7/12(2006.01), H03D7/14(2006.01), H04B1/26(2006.01)		
Applicant Matsushita Electric Industrial Co., Ltd.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
- 3.

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4. This report contains indications relating to the following items:

- ☒ I Basis of the report
- ☐ II Priority
- ☐ III Non-establishment of opinion with regard to novelty, inventive step or industrial applicability
- ☐ IV Lack of unity of invention
- ☒ V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ VI Certain documents cited
- ☐ VII Certain defects in the international application
- ☐ VIII Certain observations on the international application

Date of submission of the demand 22 September 2005	Date of completion of this report 30 March 2006
Name and mailing address of the IPEA/JP Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

**I . Basis of the report**

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

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2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed " and are not annexed to this report)*.

☒ The international application, as originally filed/furnished

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V. Reasoned statement under Rule 12 (PCT Article 35(2)) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims 2, 4, 5-8, 10, 11, 13, 15-16	YES
	Claims 1, 3, 9, 12, 14	NO
Inventive Step(IS)	Claims 8, 13	YES
	Claims 1-7, 9-12, 14-16	NO
Industrial Applicability (IA)	Claims 1-16	YES
	Claims NONE	NO

2. CITATIONS AND EXPLANATIONS (Rule70.7)

Reference 1: JP 04-129407 A (Alps Electric Co., Ltd.), 30 April, 1992  
Reference 2: JP 07-254821 A (NEC Corp.), 03 October, 1995  
Reference 3: JP 2001-522566 A (Maxim Integrated Products, Inc.), 13 November, 2001  
Reference 4: JP 09-069730 A (NEC Corp.), 11 March, 1997.

The inventions as defined in Claims 1, 3, 9, and 12 are the same as those described in Figs. 1 to 3 of Reference 1 that is cited in the International Search Report. In addition, the invention as defined in Claim 14 is the same as that described in Fig. 2 of Reference 1 that is cited in the International Search Report.

Therefore, the inventions as defined in Claims 1, 3, 9, 12, and 14 do not involve in novelty and inventive steps, in view of Reference 1 cited in the International Search Report.

Reference 1 cited in the International Search Report describes that "To improve distortion characteristics, a differential amplifier consisting of transistors Q5 and Q6 requires a large collector current. On the other hand, to improve noise factor characteristics of a double balanced mixer consisting of transistors Q1, Q2, Q3, and Q4, the collector current must be reduced." (Page 2, lower-left column, lines 4-9).

Further, Reference 2 cited in the International Search Report describes that transistors are connected in parallel to reduce a flowing current.

Therefore, the inventions as defined in Claims 2, 10, and 11 are obvious from References 1 and 2 cited in the International Search Report, and do not involve in inventive steps.

TRANSLATION of Form PCT/IPEA409  
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.  
PCT/JP2004/016938

VI Certain documents cited

1. Certain published documents (Rule 70.10)

Application No. <u>Patent No.</u>	Publication date <u>(day/month/year)</u>	Filing date <u>(day/month/year)</u>	Priority date(valid claim) <u>(day/month/year)</u>
JP2004-104515 A [P, X]	2 April 2004 (02.04.2004)	10 September 2002 (10.09.2002)	

2. Non-written disclosures (Rule 43,2.1 and 70.9)

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## Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of V.

Reference 3 cited in the International Search Report describes a technical idea of providing a bias current supply circuit for additionally supplying a bias current only to an output load unit.

Therefore, the invention as defined in Claim 4 is obvious from References 1 and 3 cited in the International Search Report, and does not involve in an inventive step.

As the mixer described in Fig. 1 of Reference 4 cited in the International Search Report is a double balanced type and the mixer described in Fig. 2 is a single balanced type, and because of their similarity in the structure, transformation of the mixer described in Figs. 1 to 3 of Reference 1 that is cited in the International Search Report into a single balanced type is obvious to a person skilled in the art.

Therefore, the inventions as defined in Claims 5 and 7 are obvious from References 1 and 4 cited in the International Search Report, and do not involve in inventive steps.

As the point that the mixer is a single balanced type is the same as in Claims 5 and 7, and the point that the transistors are connected in parallel is the same as in Claims 2, 10, and 11, the invention as defined in Claim 6 is obvious from References 1, 2, and 4 cited in the International Search Report, and does not involve in an inventive step.

None of the References cited in the International Search Report describes that a current source for additionally supplying a current only to load resistors is provided.

Therefore, the inventions as defined in Claims 8 and 13 involve inventive steps.

As replacement of a bipolar transistor by an MOS transistor is obvious to a person skilled in the art, the invention as defined in Claim 15 is obvious from Reference 1 cited in the International Search Report, and does not involve in an inventive step.

As a fact that a mixer circuit is used for a receiving system according to the direct conversion system or a receiving system according to the Low-IF system is obvious to a person skilled in the art, the invention as defined in Claim 16 is obvious from Reference 1 cited in the International Search Report, and does not involve in an inventive step.